

I/WE CLAIM:

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1. Apparatus for transmission coordination, comprising:
    - a first radio transceiver operating in accordance with a first communication protocol and using a frequency band;
    - a base station operating in accordance with the first communication protocol;
    - a second radio transceiver operating in accordance with a second communication protocol and using the frequency band;
    - a coordinator associated with the base station for, in turn, activating the first radio transceiver, deactivating the first radio transceiver, activating the second radio transceiver, and deactivating the second radio transceiver.
  2. The apparatus of claim 1, wherein the frequency band is about 2.4 GHz.
  3. The apparatus of claim 2, wherein the first communication protocol is the IEEE 802.11 protocol.
  4. The apparatus of claim 3, wherein the second communication protocol is the Bluetooth protocol.

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5. The apparatus of claim 4, wherein the first radio transceiver and the second radio transceiver are mounted together in a housing.
  6. The apparatus of claim 5, wherein the housing is suitable for wearing on a belt.
  7. The apparatus of claim 5, further comprising one or more slave devices associated with the second transceiver and operating in accordance with the second communication protocol.
  8. The apparatus of claim 7, wherein at least one of the one or more slave devices is a scanner capable of being worn on a user's finger.
  9. The apparatus of claim 8, wherein the scanner is capable of transmitting bar code information to the second transceiver.
  10. The apparatus of claim 7, wherein at least one of the one or more slave devices is a printer.
  11. The apparatus of claim 7, wherein at least one of the one or more slave devices is a personal data managing device.

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12. The apparatus of claim 5, wherein the period between activating the first radio transceiver and deactivating the first radio transceiver comprises a first time period and wherein the period between activating the second radio transceiver and deactivating the second radio transceiver comprises a second time period, and wherein the first time period and second time period are at fixed, predetermined intervals.

13. The apparatus of claim 12, wherein the first time period and the second time period are of equal intervals.

14. Apparatus for transmission coordination, comprising:  
a first radio transceiver operating in accordance with a first communication protocol and using a frequency band,  
a base station operating in accordance with the first communication protocol;  
a second radio transceiver operating in accordance with a second communication protocol and using the frequency band, wherein the first radio transceiver and the second radio transceiver are mounted together in a housing;  
a coordinator associated with the housing, for, in turn, activating the first radio transceiver, deactivating the first radio transceiver, activating the second radio transceiver, and deactivating the second radio transceiver.

15. The apparatus of claim 14, wherein the frequency band is about 2.4 GHz.

16. The apparatus of claim 15, wherein the first communication protocol is the IEEE 802.11 protocol.

17. The apparatus of claim 16, wherein the second communication protocol is the Bluetooth protocol.

18. The apparatus of claim 14, wherein the period between activating the first radio transceiver and deactivating the first radio transceiver comprises a first time period and wherein the period between activating the second radio transceiver and deactivating the second radio transceiver comprises a second time period, and wherein the first time period and second time period are at fixed, predetermined intervals.

19. The apparatus of claim 18, wherein the first time period and the second time period are of equal intervals.

20. Apparatus for transmission coordination, comprising:  
a first radio transceiver operating in accordance with an IEEE 802.11 protocol and using a frequency band of about 2.4 GHz and having a first antenna system;

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a base station operating in accordance with the IEEE 802.11 protocol;

a second radio transceiver operating in accordance with a Bluetooth protocol and using the frequency band of about 2.4 GHz and having a second antenna system;

wherein the first antenna system and the second antenna system are of orthogonal polarization.

21. Apparatus for transmission coordination, comprising:

a first radio transceiver operating in accordance with an IEEE 802.11 protocol and using a frequency band of about 2.4 GHz;

a base station operating in accordance with the IEEE 802.11 protocol;

a second radio transceiver operating in accordance with a Bluetooth protocol and using the frequency band of about 2.4 GHz;

wherein the Bluetooth protocol transmission transmits at power level of about 0 dBm.

22. Apparatus for transmission coordination, comprising:

a first radio transceiver operating in accordance with an IEEE 802.11 protocol and using a frequency band of about 2.4 GHz, the frequency band of about 2.4 GHz having two or more sub-bands;

a base station operating in accordance with the IEEE 802.11 protocol;

a second radio transceiver operating in accordance with a Bluetooth protocol and using the frequency band of about 2.4 GHz;

wherein the IEEE 802.11 protocol transceiver uses one of the two or more sub-bands and the Bluetooth protocol transceiver uses another of the two or more sub-bands.

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23. Apparatus for transmission coordination, comprising:

a first radio transceiver operating in accordance with an IEEE 802.11 protocol and using a frequency band of about 2.4 GHz, the frequency band of about 2.4 GHz having two or more sub-bands;

a base station operating in accordance with the IEEE 802.11 protocol;

a second radio transceiver operating in accordance with a Bluetooth protocol and using the frequency band of about 2.4 GHz;

wherein the second radio transceiver is equipped with a look-ahead function for determining whether the two or more sub-bands are being used by the first radio transceiver that will also be used by the second transceiver.

24. Apparatus for transmission coordination, comprising:

a first radio transceiver operating in accordance with a first communication protocol and using a frequency band;

a base station operating in accordance with the first communication protocol;

a second radio transceiver operating in accordance with a second communication protocol and using the frequency band;

a coordinator associated with the first radio transceiver for deactivating the second radio transceiver while the first radio transceiver is in use.

25. A method for operating a portable data communications device using first and second wireless data communications protocol comprising:

operating said data communications device in a power saving mode of said first communication protocol, whereby said device has active time periods for transmitting and receiving data communications signals using said first communications protocol and dormant time periods during which said device neither transmits nor receives data communications signals using said first protocol;

operating said data communications device as a master device according to said second communications protocol whereby said data communication device controls operation of slave devices communicating therewith; and

controlling said operation according to said second data communications protocol to operate only during said dormant time periods.

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26. A method as specified in claim 25 wherein said controlling comprises providing a signal indicating that said active time period will commence following a predetermined time interval and terminating operation according to said second data communication protocol during said predetermined time interval.

27. A method as specified in claim 25 wherein said first wireless data communications protocol is the IEEE 802.11 protocol.

28. A method as specified in claim 27 wherein said second wireless communication protocol is Bluetooth.

29. A method for operating a wireless data communications system having an access point and at least one mobile unit associated with said access point using a first wireless protocol, wherein said mobile unit is arranged to conduct wireless data communications with other units using a second wireless protocol, comprising:

transmitting periodic beacon signals from said access point according to said first wireless protocol;

transmitting global clear to send signals from said access point according to said first wireless protocol, said global clear to send signals preventing mobile units from transmitting signals using said first data communications protocol during an allocated time interval within said beacon signal period;

controlling said access point to avoid transmissions during said allocated time interval;

operating said mobile unit in response to said global clear to send signal to conduct wireless communications acting as a master unit using said second wireless protocol during said allocated time interval.

30. A method as specified in claim 29 wherein said first wireless data communications protocol is the IEEE 802.11 protocol.

31. A method as specified in claim 30 wherein said second wireless communication protocol is Bluetooth.

32. A method according to claim 29 wherein said beacon signal period is divided into three time intervals, and wherein said access point conducts power saving mode data communications during a first time interval, wherein said allocated time interval is a second time interval and wherein said access point conducts data communications using said first wireless protocol during a third time interval.

33. A method according to claim 32 wherein said first time interval is immediately following said beacon signal.

34. A method as specified in claim 32 wherein said first wireless data communications protocol is the IEEE 802.11 protocol.

35. A method as specified in claim 34 wherein said second wireless communication protocol is Bluetooth.

36. A method of operating a data communications system using a master-slave protocol, wherein a master transceiver transmits to slave units during first even time slots and wherein slave units transmit to said master unit during odd time slots, and wherein said transmissions follow a predetermined frequency hop pattern at a hop rate corresponding to said time slots, comprising:

operating said master unit during a first time period of each time slot to detect interfering signals at a frequency corresponding to the following time slot, and

inhibiting transmission by said master transceiver during even time slots if interfering signals have been detected during either of the current or previous time slots.

37. A method according to claim 36, wherein said operating step comprises tuning said master unit to receive signals corresponding to the frequency allocated to the next following time slot; detecting the strength of signals received and

retuning said master unit to send or receive signals corresponding to the frequency allocated to the current time slot.

38. A method according to claim 37 wherein said protocol is Bluetooth.

39. A method for providing voice communications in a wireless data communications system having a mobile unit arranged to communicate with an access point using a first data communications protocol and arranged to communicate with other devices using a second data communications protocol, comprising:

communicating data corresponding to said voice communication between said access point and said mobile unit using said first data communications protocol;

communicating said data corresponding to said voice communications between said mobile unit and a portable device using said second data communication protocol, said communication being arranged at time intervals which avoid interference with said communicating using said first data communications protocol; and

converting voice signals to data corresponding to said voice signals and converting data signals corresponding to voice signal into voice signals in said portable device.

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40. A method as specified in claim 39 wherein said data corresponding to voice signals comprises compressed voice signal data.
41. A method as specified in the claim 39 wherein said first communications protocol is the IEEE 802.11 protocol.
42. A method according to claim 41 wherein said second communication protocol is Bluetooth.
43. A method according to claim 42 wherein said communication between said mobile unit and said portable device uses a Bluetooth ACL link.
44. A method as specified in claim 43 wherein said data corresponding to voice signals comprises compressed voice signal data.
45. A method for operating a mobile unit arranged to communicate using first and second data communication protocols operating in the same frequency band wherein said mobile unit associates with an access point and receives therefrom beacon signals demarcating time intervals according to said first communications protocol, comprising:

receiving signals from said access point designating a portion of one of said time intervals during which mobile units associated with said access point refrain from transmissions using said first data communications protocol, and operating said mobile unit as a master unit using said second data communications protocol to communicate with slave units during said designated portion of said time interval.

46. A method as specified in claim 45 wherein said first protocol is the IEEE 802.11 protocol.

47. A method as specified in claim 46 wherein said signals comprise CTS signals.

48. A method as specified in claim 47 wherein said second protocol is Bluetooth.

49. A method for operating a wireless data communications network having at least one access point and at least one mobile unit, including a mobile unit arranged to communicate with said access point using a first wireless data communication protocol in a first frequency band and to communicate with other devices using a second wireless data communication protocol in said first frequency band, comprising:

transmitting signals from said access point in said first communications protocol, said signals designating a time period wherein mobile units associated with said access point refrain from transmitting using said first data communications protocol; and

operating said mobile units as a master unit to conduct wireless data communications with said other devices operating as slave units using said second data communications protocol during said designated time period.

50. A method as specified in claim 49 wherein said first communications protocol is the IEEE 802.11 protocol.

51. A method as specified in claim 49 wherein said signals comprise CTS signals.

52. A method for operating a mobile unit arranged to communicate using first and second data communications protocols operating in the same frequency band, wherein said mobile unit associates with an access point, comprising:

receiving in said mobile unit first and second control signals using said first data communications protocol;

operating said mobile unit in response to said first control signals to act as a master unit and conduct data communications with slave units using said second data communications protocol; and

discontinuing communications by said mobile unit using said second data communications protocol in response to said second control signal.

53. A method as specified in claim 41 wherein said first protocol is the IEEE 802.11 protocol.

54. A method as specified in claim 42 wherein said signals comprise CTS signals.